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LUMPY PRODUCT IN ANIMAL FOOD COMPOSITIONS
AND PROCESS FOR THE PRODUCTION THEREOF

BACKGROUND OF THE INVENTION

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The present invention relates to a lumpy product in animal food compositions and to a process for the production thereof.

Although nowadays there are numerous different animal foods in varied forms, they can be subdivided into two groups; on the one hand conventional instant animal foods, comprising a solid and a liquid phase, i.e. generally pieces of meat and a sauce or gravy around said pieces; and dry foods, in the form of specially shaped pellets, which result from a strong water abstraction, e.g. complete baking of a semifluid paste.

It has been found that in the case of instant animal food consisting of pieces of meat and gravy, the solid constituents of the food can easily stick to the teeth of the animal and consequently contribute to a much worse oral hygiene. In addition, due to the pasty or very soft consistency of the food the latter, instead of being chewed, is swallowed. No adequate comminution of the food takes place in the mouth, so that digestion is transferred to the gastrointestinal tract. As a result of an increased eating rate and the gulping of the food by the animal, no adequate salivation occurs and consequently the mouth is inadequately cleaned with respect to bacteria.

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Dry foods must be mechanically comminuted in chewing-intensive manner, so that as a result of chewing dental plaque is reduced and the gums have a better blood flow. Compared with moist foods, dry foods are not eaten as readily and can even be refused by the animal.

Tests have been carried out for the production of a lumpy animal food without using meat lumps. Thus, DE 2 728 512 A1 and DE 2 650 800 A1 disclose a wet food for pets, which has as a constituent heat-stable, meat-like blood-based lumps and provide a formulation for the lumps which is characterized by the presence of blood constituents and rubber. In both documents the strength of the lumps is determined by the addition of a given rubber quantity. Optionally, as a further ingredient, use can be made of an additional protein source, which can comprise animal or vegetable protein or mixtures thereof. However, the strength is solely determined by the addition of a suitable rubber. A graded setting of the strength and texture of the lump is not possible.

An object of the invention is to combine the positive aspects of the two animal food types, i.e. the health-encouraging aspect of dry food with the comparatively higher consumption attractiveness of the two-component instant food.

A further object of the invention is to provide a chunk in which the texture and strength can be adjusted in a graded manner, together with a process for the production thereof.

SUMMARY OF THE INVENTION

According to the invention , these objects are achieved by a lumpy product or chunk, which is suitable for admixing in or as the sole constituent of animal food compositions and which contain proteins, one or more water-binding components, water and salt, characterized in that it comprises at least one phase, in which the proteins, as a result of a suitable denaturing stage, form a matrix characterized by high strength and which is able to withstand processes such as sterilization and storage for several years without significant losses and further characterized in that the proteins come from concentrated blood plasma and/or blood plasma powder and/or egg albumin powder and/or wheat

gluten and/or soybean proteins. Additionally, the water-binding components are either obtained from
the group flour/starch/waxy maize starch or the group silica/physiologically unobjectionable metal
oxides/other atoxic inerts, water-absorbing substances or the group cellulose powder/plant fibers or a
combination of substances from the different groups. The texture of the chunk is defined solely through
5 the choice of the nature and quantity of the proteins and water-binding components.

It has been found that such a lump product, hereinafter called chunk for short, has a much
greater strength than conventional meat pieces in a two-component instant food, so that the animals are
forced to intensively chew the food, which leads to a reduction of dental plaque and a chunk according
to the invention is gladly consumed by animals. Simultaneously through the planned choice of
ingredients, it is possible to vary and adjust the texture of the chunks from brittle to elastic in
accordance with individual needs or the planned use of the animal food. The ingestion of the chunks
according to the invention takes place as a result of intensive chewing instead of gulping and for animals
would appear to be more interesting than the consumption of conventional animal foods.

For solving the set problem importance is attached to the particular choice of functional
proteins, alone or combined with other constituents having a cereal base, e.g. wheat flour, in order to
15 obtain the desired texture characteristics. The desired texture results from the fact that the specifically
chosen combination of proteins is coagulated, the released water is absorbed by the wheat flour, which
is thereby made into a paste. Optionally a further water-binding component can be added, whose
choice with regards to nature and quantity also has a decisive influence on the texture of the chunk.

20 Thus, a chunk is provided, whose texture can be adjusted according to needs.

In order to ensure an increased strength of the protein matrix, it is in particular provided that the

fat/oil proportion in the solid phase of the chunks according to the invention represent below 5% and preferably below 2%. The proteins of the chunks emanate from concentrated blood plasma and/or blood plasma powder and/or egg albumin powder and/or wheat gluten and/or soy proteins.

A preferred embodiment is characterized in that the water-binding components come either 5 from the group of flour/starch/waxy corn starch or the group of silicas/physiologically unobjectionable metal oxides/other non-toxic inerts, water-absorbing substances or the group of cellulose powder/vegetable fibers or a combination of substances from the different groups.

For the production of the chunks according to the invention, it is in particular provided that the weight ratio of the protein-containing ingredients to the water-binding components is in the range 2.5:1 to 0.3:1. In a preferred embodiment, the weight ratio is 2:1. In another embodiment, the weight ratio is 0.48:1.

It is in particular provided that following the production of the chunks, the content of proteins represents 10 to 35 wt.%, of flour/starch/waxy corn starch 15 to 40 wt.% and of silicas/physiologically unobjectionable metal oxides/other non-toxic inerts, water-absorbing substances or cellulose powder/vegetable fibers 5 to 25 wt.%.

Following production, preferably the ratio of proteins to flour is between 0.6 and 1.4, the moisture content being between 35 and 65%, the carbohydrate content between 10 and 30% and the fat proportion below 5%, preferably below 2%.

In another preferred embodiment, the chunks comprise an inner and an outer phase, the outer 20 phase containing the high strength protein matrix which is at least 10 and preferably at least 18 times more resistant to deformation than the inner phase. The inner phase is formed from cooked or

uncooked meat fractions.

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In another preferred embodiment, the chunks comprise an inner and an outer phase, the inner phase containing the high strength protein matrix and is at least 10 and preferably 18 times more resistant to deformation than the outer phase, which is an emulsion or a gel or has a soft, easily deformable consistency.

It is stressed that the limitation of the description to chunks comprising only two phases is not to be understood as a restriction. In fact, the invention also covers chunks with three, four or more phases, which differ as regards their strength.

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The invention also relates to a process for the production of a lumpy product or chunk, in which for the production of the high strength phase, the proteins are dissolved in water. The water-binding substances are then dispersed in the protein solution. The viscosity of the thus obtained suspension is adjusted by an appropriate addition of swellable or water-absorbing substances. The obtained phase is shaped into strands of a clearly defined size. The obtained strands undergo a denaturing stage and are then cut to an appropriate size and are packed and sterilized alone or, optionally, with other components. Further, the texture of the chunk is solely determined by the choice of the nature and quantity of the proteins and the water-binding component. The proteins are preferably dissolved in water, accompanied by the addition of salt. According to the invention, it is also preferred that the water-binding substances, which are dispersed in the protein/salt solution, belong to the flour/starch/waxy corn starch group.

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For the purpose of adjusting the viscosity of the suspension, use is preferably made of one or more substances from the group flour/silica/physiologically unobjectionable metal oxides/other non-

toxic, inert water-absorbing substances/cellulose powder/vegetable fibers.

According to a preferred embodiment of the invention, the shaped strands have an average diameter of 10 to 35 mm.

It is particularly preferable for the process according to the invention, that the denaturing stage involves a temperature change or a pH-value change. In a preferred embodiment of the invention, the temperature is raised to at least 85° C for carrying out the denaturing stage.

Preferably, following the cutting stage, the chunks obtained have a size suitable for consumption.

The invention is described in greater detail hereinafter relative to the following examples and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-section through a nozzle for producing a two-phase chunk and the diagrammatic representation of a two-phase chunk following production.

Fig. 2 is the representation of the force required for breaking open the two phases in a two-phase chunk.

Example 1

Formulations and analytical results of the solid phase of a chunk according to the invention

In order to determine the influence of different ingredients on the biting consistency and texture, experiments were carried out with different formulation compositions according to Table 1. It has been found that in particular the absence of silica or the presence of wheat gluten or cellulose powder led to a produced chunk having an elastic consistency. The brittle chunks produced with silica only differed

slightly from the analytical standpoint from the elastic chunks produced without silica, as can be gathered from Table 2. Elastic chunk 3 has the lowest moisture content.

Table 1: Formulations for the solid phase of an inventive chunk (values in wt.%)

Formulation No.	1	2	3	4	5
Silica	10.5	13	—	11	—
Conc. Blood plasma	67	—	—	—	—
Albumin powder	—	18	26	17.5	17.5
Wheat flour	22	25	25	25	25
Wheat gluten	—	—	8.5	—	—
Cellulose powder	—	—	—	—	11
Salt	0.5	0.5	0.5	0.5	0.5
Water	—	43.5	40	46	46
Total	100	100	100	100	100
Texture	brittle	brittle	elastic	brittle	elastic

Table 2: Analytical results of the chunks produced according to Table 1 (values in wt.%)

Product	1	2	3	4	5
Moisture	54	48	45	50	50
Protein	15	18	32	18	18
Fat	0.6	0.8	1.3	0.8	0.8
Carbohydrates	14	17	17	17	17

Example 2

Production of chunks having brittle characteristics

The mixed, dry formulation components of formulation 1 are continuously dosed into a suitable

mixer and mixed there with a corresponding amount of water. The viscous paste is shaped by means of nozzles on a steam tunnel to strands and completely baked. The chunks are cut and sterilized in cans.

Example 3

Production of chunks characterized by elastic characteristics

5 The mixed, dry formulation components of formulation 3 are continuously dosed in a double-shaft mixer and mixed there with a corresponding amount of water. The viscous phase is shaped by means of nozzles on a steam tunnel to strands and completely baked. The chunks are cut and sterilized in cans.

Example 4

Production of a two-phase chunk with an outer, solid and an inner, soft phase

The ingredients of formulation 3 are mixed in the following way. Firstly, the albumin powder is dissolved, accompanied by the addition of salt in an apparatus and then the wheat flour and wheat gluten are incorporated into the suspension. Phase A obtained is pumped into the outer tube 1 of a nozzle, which is constructed from two concentrically arranged tubes of different diameters (28 and 16 mm). A conventional phase B, i.e. comprising cooked meat pieces, is pumped through the inner tube

15 2. The concentric double strand is baked in a steam tunnel and then cut up.

Example 5

Analytical results of a two-phase chunk following sterilization

20 The chunks produced according to example 4 were analyzed in phase-specific manner and the results summarized in table 3 were obtained.

Table 3: Analytical results in a two-phase chunk after sterilization

	Solid phase [%]	Soft phase [%]
Moisture	65.3	67.6
Protein	14.5	9.9
5 Fat/Oil	0.3	9.5
Ash	9.3	2.6

Fig. 1 is a cross-section through a nozzle for the production of two-phase chunks. An outer tube 1 and an inner tube 2 with different diameters are arranged concentrically and two different phases A and B are pumped through the outer/inner tubes. This leads to an approximately tubular strand, comprising a core phase and a covering phase. The resulting strand is fixed by heat action on a steam tunnel/gas oven and then cut to chunks C of the correct size.

Fig. 2 represents the force required for the breaking open of the two phases in a two-phase chunk. Deformation takes place by means of a mortar or ram and the force is given in Newtons as a function of the deformation path in mm. The two different phase strengths corresponding to the two-stage deformation of the chunks can be seen.

The features of the invention given in the description, claims, tables and drawings can be used to implement the different embodiments of the invention, both singly and in random combination.